Brief Communications

Brachial artery cannulation in type A aortic dissection operations

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Galajda, Péterffy, and Szentkirályi (*left* to *right*)

Axillary artery cannulation has proved to be advantageous for heart operations executed with cardiopulmonary bypass in the presence of severe peripheral occlusive disease, atherosclerosis of the femoral vessels, or distal extension of the aortic dissection.[1,2] Arterial perfusion through the right axillary artery is more likely to perfuse the true lumen and should be advantageous in acute dissections involving the ascending aorta.[3,4]

At the same time, axillary artery cannulation can also be dangerous and, because of the proximity of the aortic arch and carotid arteries, could be the source of iatrogenic aortic dissection.[5] We describe 2 cases of aortic dissection operations for which brachial artery cannulation was successfully applied.

Clinical Summary

A 67-year-old man (body surface, 1.92 m^2) was admitted on November 17, 2001, to our institute as an acute case, with a diagnosis of type A aortic dissection. Neurologic symptoms of amaurosis and confusion were present. In addition, acute lower-limb ischemia occurred on the right side.

The operation was carried out immediately, applying left-side brachial artery and right atrial cannulation. The aortic valve commissures were resuspended with pledget-supported mattress sutures, the dissected intimal tear was fixed with surgical adhesive (BioGlue; CryoLife International, Inc, Kennesaw, Ga), and the ascending aorta was replaced with a 30-mm Dacron prosthesis. The operation was carried out without total circulatory arrest.

Ten hours after the operation, the patient was extubated, and his consciousness and vision returned completely. The patient was kept under observation in the intensive care unit for 48 hours, and 10 days after the operation, he left our institute free from complaints.

A 36-year-old man (body surface area, 2.0 m^2) was known to have Marfan syndrome. Echocardiography was used to certify type A aortic dissection with fourth-degree aortic incompetence. The dissection did not involve the 2 femoral arteries. An acute operation was performed on January 20, 2002.

Right-sided brachial artery and right atrial cannulation were performed. The aortic valve and the ascending aorta were replaced with a composite graft (Bentall procedure). We did not apply total circulatory arrest.

The next day, the patient was transferred from the intensive care unit, and 8 days after the operation, he left our institute free from complaints.

The Brachial Artery Cannulation Technique

The suitable upper limb is positioned in 70° abduction and supination. A 6- to 8-cm incision is made in the medial bicipital sulcus above the proximal part of the brachial artery and distal directly from the latissimus dorsi and teres major muscle insertions. The fascia around the neurovascular bundle is cut through longitudinally (Figure 1). The ulnar nerve is covered with sheets soaked in physiologic salt solution and pulled slightly in the medial direction. The brachial artery is completely prepared and then clamped down atraumatically between 2 clamps. The artery is opened transversly with an inclined cut of 45°, and a 20F Fem-Flex femoral arterial cannula (Baxter Healthcare Corp, Santa Ana, Calif) is slid up into the brachial artery lumen, such that the end of the cannula does not extend beyond the origin of the

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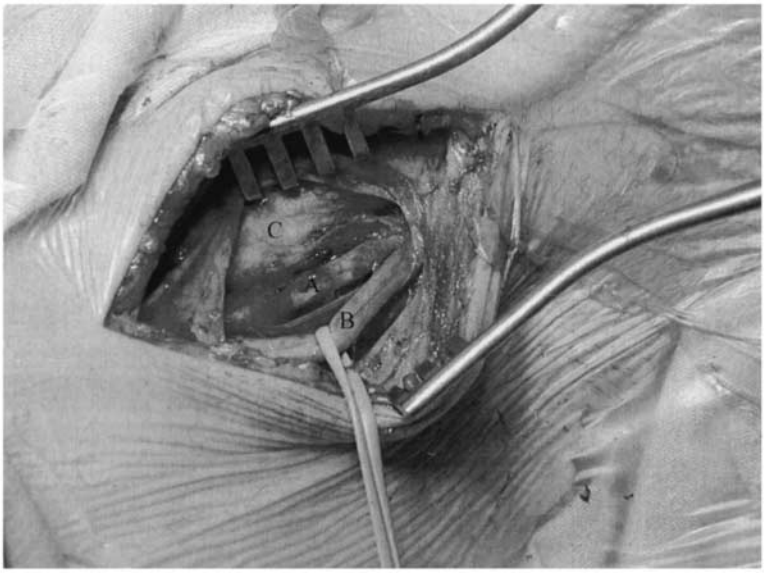

Figure 1. The proximal part of the right brachial artery is exposed for cannulation (intraoperative aspect): *A,* brachial artery; *B,* ulnar nerve; *C,* biceps.

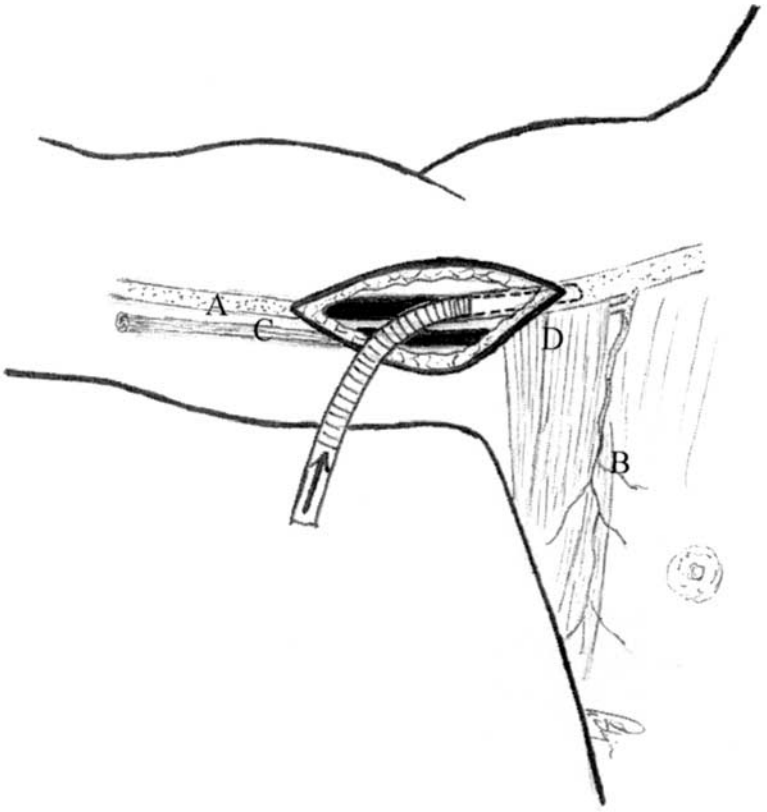

Figure 2. Right brachial artery cannulation and position of the cannula below the subscapular artery: *A,* brachial artery; *B,* subscapular artery; *C,* ulnar nerve; *D,* latissimus dorsi insertion.

subscapular artery, in this way retaining the opportunity for collateral circulation of the upper limb during cardiopulmonary bypass (Figure 2).

The cannula is fixed with the help of a tourniquet, and then this is stitched to the upper (lateral) edge of the wound with one stitch. The distal artery clamp is left in place up to the time of decannulation.

The cannula is removed at the end of the operation, and the brachial artery is restored with a 5-0 Prolene running suture (Ethicon, Inc, Somerville, NJ). In both presented cases, perfect perfusion during cardiopulmonary bypass could be provided.

Discussion

Cannulation of the axillary artery is counted as particularly advantageous for aortic dissection operations, and thus the anterograde flow into the dissected aorta is ensured.

The brachial artery cannulation applied by us in 2 cases (one on the right side and one on the left side) proved to be suitable and can be carried out quickly, and the cannulation site is at a good distance from the aortic arch. In this way there is less likelihood of postcannulation iatrogenic dissection spreading to the aorta. At the same time, the periscapular collateral circulation of the upper limb remained unaffected through the subscapular artery during cardiopulmonary bypass.

The brachial artery proved to be an easily accessible site of peripheral cannulation, which can be quickly carried out without complications.

In neither case were early or late neurologic complications observed in the upper limb.

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Atypical paraplegia after aortic intramural hematoma

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Aortic intramural hematoma (IMH) has previously been reported both at necropsy and in vivo and was recently described as a distinct entity. IMH appears to be characterized primarily by aortic wall hematoma without demonstrable intimal flap and occurs as a result of spontaneous rupture of the vasa vasorum[1] or intimal fracture of an atherosclerotic plaque, which allows blood propagation into the aortic media.[2]

On the basis of its pathologic feature, mesenteric ischemia by means of branch occlusion is supposed to be complicated with IMH. However, few incidents of perfusion disorder after IMH have been reported, whereas 2.5% to 12.0% of aortic dissections are complicated.[3] We report a rare case of IMH resulting in ischemia of the spinal cord and the right iliopsoas muscle, representing atypical paraplegia.

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Clinical Summary

At 5 PM on February 1, 2002, a 46-year-old patient had sudden onset of chest pain. On admission, he was hypertensive (182/80 mm Hg), and extremity pulses were palpated normally. Electrocardiography revealed a normal sinus rhythm and no ST-T–segment change. Computed tomography (CT) revealed IMH from the ascending to infrarenal abdominal aorta. Echocardiography showed no aortic regurgitation or pericardial effusion. Type A IMH with a 40-mm maximum diameter was diagnosed, and therefore antihypertensive therapy was preferred.

Weakness of the right thigh and calf was noted at 7 PM. After rapid, severe progress involving the left leg, the symptom was stabilized (modified Tarlov score of 0, Table 1). Sensory loss was observed on the right lower thigh. There was no other neurologic disorder. Cerebrospinal fluid (CSF) drainage at the lumber subarachnoid space was initiated at 10 PM. Primary CSF pressure was greater than 20 cm H_2O. Rapid regression of the pressure to 10 cm H_2O was marked after drainage. Two hours after drainage, the weakness was resolved, and within the subsequent 6 hours, the